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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/716,565	11/20/2000	Evaggelos Geraniotis	2000-0122	7527

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EXAMINER	
BAYARD, EMMANUEL	

ART UNIT	PAPER NUMBER
2631	12

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/716,565	GERANIOTIS ET AL.	
	Examiner	Art Unit	
	Emmanuel Bayard	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This is in response to amendment filed on 3/15/04 in which claims 1-20 are pending. The applicant's amendments have been fully considered but they are moot based on the new ground of rejection.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sexton et al U.S. Patent No 5,818,887 in view of Vanghi et al U.S. Patent No 6,597,923 B2.

As per claim 1, Sexton et al discloses method for use in a receiver for detecting and demodulating at least one signal of M-ary orthogonal symbols (MOK) comprising the steps of receiving coded M-ary orthogonally modulated symbols over a channel (see fig.4 element 60, and col.3, lines 15-65); demodulating said M-ary orthogonally modulated symbols (see fig.4 element 70 and col.10, lines 36-40 and col.11, lines 16-17); decoding said symbols (see fig.4 element 76 and col.4, lines 42-62).

However Sexton does teach calculating a metric; calculating probabilities of different symbols for each symbol; estimating a fading channel responsive to calculating the probabilities; iteratively feeding said metric, said decoded symbols, said probabilities and said estimate back into said demodulating step to re-demodulate said symbols coherently.

Vanghi et al teaches teach calculating a metric (see col.2, line 20 and col.6, line 60); an error detector is functionally equivalent to the claimed (calculating probabilities of different symbols for each symbol) (see fig.2 element 220); estimating a fading channel responsive to calculating the probabilities (see fig.2 element 205 and col.6, line 14); iteratively feeding said metric, said decoded symbols, said probabilities and said estimate back into said demodulating step to re-demodulate said symbols coherently (see figs1-4 element 106 and col.5, lines 60-67 and col.6, lines 1-67 and col.7, lines 20-67).

It would have been obvious to one of ordinary skill in the art to implement the teaching Vanghi into sexton as to determine a correct frame of digital information as taught by Vanghi (see col.7, lines 20-21).

As per claim 2, Sexton does include convolutionally coded (see col.3, lines 5-15).

As per claims 3 and 14, Sexton teaches demodulating said signal is performed coherently and noncoherently (see col.3, line 36).

As per claims 4, 5, 16 and 17, it would have been obvious to one of ordinary skill in the art to implement testing the decoded signal for recognition improvement and repeating steps b through f iteratively until no recognition improvement is detected of Vanghi into Sexton as determine a correct frame of digital information as taught by Vanghi (see col.7, lines 20-21).

As per claim 6, Sexton teaches the step of de-interleaving (see fig.4 element 78).

As per claims 7 and 8, Vanghi does include a log likelihood ratio (see abstract). Furthermore implementing such teaching into Sexton would have been obvious to one skilled in the art as to achieve a desired level of signal quality at the lowest possible transmission.

As per claim 9, it would have been obvious to one of ordinary skill in the art to implement calculating chip probabilities after the step of calculating symbol probabilities into Sexton as to provide accurate signal quality feedback in terms of SNR to the demodulator.

As per claims 10, 11, 18 and 19, Sexton does include using a filter (see fig.4 element 64).

As per claims 12 and 20, it would have been obvious to one of ordinary skill in the art to implement estimating step is performed in a first instance using only a known first chip and following a first instance of said decoding unknown chips being also used to estimate the fading channel into Sexton as to provide accurate signal quality feedback in terms of SNR to the demodulator.

As pre claim 13, Sexton et al teaches method for a receiver for detecting and demodulating at least one signal of complementary code keying (CCK) symbols comprising the steps of: receiving M-ary is equivalent to the claimed (complementary coded keying) (CCK) modulated symbols over a channel (see fig.4 element 60, and col.3, lines 15-65); demodulating said complementary code keying modulated symbols (see fig.4 element 70 and col.10, lines 36-40 and col.11, lines 16-17); decoding said symbols (see fig.4 element 76 and col.4, lines 42-62) adding an extra known chip at a beginning of every symbol (see fig.4 element 133); calculating expected values of complex conjugates of every chip (see col.4, lines 25-31).

However Sexton does not teach average metric is functionally equivalent to the claimed (calculating probabilities) of different symbols for each symbol instance; estimating the fading channel at different chip positions within said symbol (see fig.2 element 205 and col.6, line 14) and iteratively feeding said metric, said decoded symbols, said probabilities and said estimate back into said demodulating step to re-demodulate said symbols coherently.

Vanghi et al teaches average metric is functionally equivalent to the claimed (calculating probabilities) of different symbols for each symbol instance (see col.2, line 20 and col.6, line 60); estimating the fading channel at different chip positions within said symbol and iteratively feeding said metric, said decoded symbols, said probabilities and said estimate back into said demodulating step to re-demodulate said symbols coherently (see figs1-4 element 106 and col.5, lines 60-67 and col.6, lines 1-67 and col.7, lines 20-67).

It would have been obvious to one of ordinary skill in the art to implement the teaching Vanghi into sexton as to determine a correct frame of digital information as taught by Vanghi (see col.7, lines 20-21).

As per claim 15, Sexton would include determining an argument of a maximum of said signal and a value of said maximum signal, further determining a plurality of first bits of a cod and independently differentially demodulating remaining bits of said code as to permit joint channel estimation and data decoding with improved channel tracking capability, resulting in reliable link performance even under high user mobility.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yamao et al U.S. Patent No 6,351,498 B1 teaches a robust digital modulation and demodulation scheme.

Khayrallah et al Pub No U.S. 2002/0003846 A1 teaches a method and systems for extracting a joint probability.

Molnar U.S. Patent No 6,567,481 B1 teaches receivers including iterative MAP detection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is (703) 308-9573. The examiner can normally be reached on Monday-Thursday from 8:00 AM - 5:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour, can be reached on (703) 306-3034. The fax phone number for this Group is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3800.

Emmanuel Bayard

Primary Examiner

5/29/04

EMMANUEL
PRIMARY EX